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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,926	10/30/2003	Esko Nieminen	872.0154.U1(US)	8231
29683	7590	05/02/2006	EXAMINER	
HARRINGTON & SMITH, LLP 4 RESEARCH DRIVE SHELTON, CT 06484-6212			ABRAHAM, ESAW T	
			ART UNIT	PAPER NUMBER
			2133	

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/696,926	<b>Applicant(s)</b> NIEMINEN, ESKO	
	<b>Examiner</b> Esaw T. Abraham	<b>Art Unit</b> 2133	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-12, 17 and 18 is/are rejected.
- 7) ☒ Claim(s) 4-7 and 13-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/28/04</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims **1-18** are presented for examination.

#### ***Information Disclosure Statement***

2. The references listed in the information disclosure statement submitted on 01/28/04 have been considered by the examiner.

#### ***Specification***

3. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim objections***

4. Claims **1, 3, 8, 10 and 17** are objected to because of the following informalities:
  - a) Claims 1 and 10 recites, "A method for operating a decoder" "A decoder, comprising" in the preamble. CFR § 1.75 states that the specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention or discovery.

The suggests that following "A method for detecting the presence of a turbo coded signal, for distinguishing a received turbo coded signal from received noise and for monitoring quality of a turbo decoding process (in claim 1) and "An apparatus for

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detecting the presence of a turbo coded signal, for distinguishing a received turbo coded signal from received noise and for monitoring quality of a turbo decoding process" (in claim 10).

b) Claim 3 recites "the decoding process" instead of "a decoding process" (see claim 3, lines 5).

c) Please defines the full word of a written word or phrase for the abbreviations "WCDAM" as specified in the specification (see line 1 of claim 8).

d) Please define the full word of a written word or phrase for the abbreviations "WCDAM" as specified in the specification (see line 1 of claim 17).

e) The claims (1, 3, and 10) are objected to because the lines are not indented properly or making reading and entry of amendments difficult. Substitute the claims with proper indentation.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere CO.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims **1-3, 8, 10-12 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (U.S. PN: 6,898,254).

**As per claims 1 and 10:**

Wolf et al. teach or disclose an error control systems in data transmission, especially to iterative decoding using parallel concatenated encoders, such as turbo decoders (see col.1, lines 11-15). Wolf teaches a stopping criterion has been developed for turbo decoding that measures the SNR of the extrinsic and compares the result to a threshold. If the threshold is reached, no further iterations are executed (see col. 6, lines 25-27). Further, Wolf et al. in figure 4 shows a block diagram of a stopping criterion implementation wherein the block diagram is broken into two regions. The top half generates the two moments, which are needed to compute the SNR for the extrinsic.  $M_{sub.1}$  is the sum of the N extrinsic at any given point in the iterative decoding process, and  $M_{sub.2}$  is the sum of the squares of the N extrinsic at a given point (see col. 6, lines 52-58). Although, Wolf disclosed quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at  $+m$ . An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate less certainty in the decoded values. Further Wolf teaches that if the absolute value is

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not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold K. If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-67). It is noted however, Wolf **did not explicitly** detail the aspect of "determining whether the signal comprises a valid code or comprises only noise by the means for monitoring the decoder and means responsive to the monitored decoder" as recited in the instant claims 1 and 10. **One of ordinary** skill in the art at the time of the invention would have found it obvious to substitute the generation of signal quality estimate and then compared with the threshold value with the claimed means for detecting or monitoring the decoder. **This modification** would have been obvious because a person having ordinary skill in the art would have been motivated in order to simplify hardware implementation and improve process speed (see col. 3, lines 25-27).

**As per claim 2:**

Most of the limitations of the claim have been noted in the rejection of claim 1. In addition, Wolf et al. in figure 3 teach a turbo decoder comprising two MAP decoders (308, 310).

**As per claim 3:**

Most of the limitations of the claim have been noted in the rejection of claim 1. In addition, Wolf et al. teach that quantities are used to compute a signal-to-noise ratio

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estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at  $+m$ . An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate less certainty in the decoded values. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold  $K$ . If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-38).

**As per claim 8:**

Wolf et al. teach all the subject matter claimed in claim 1 but Wolf et al. do not explicitly detail that the decoder (turbo decoder) comprising a WCDMA UE.

Nevertheless, as would have been well known (WCDMA UE are known in the art of turbo decoding systems since turbo codes are commonly (typically) used for error correction on the CDMA forward and backward links) to one ordinary skill in the art at the time the invention was made, such WDCDMA user equipment (a mobile station) are used to communicate with any one or more of a plurality of base station subsystems in a geographic region. Accordingly, it would have been obvious to one ordinary skill in the

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art to include user equipment because such equipment would have been required to communicate with a base station in the wireless communication systems.

**As per claim 11:**

Most of the limitations of the claim have been noted in the rejection of claim 10. In addition, Wolf et al. in figure 3 teach a turbo decoder comprising two MAP decoders (308, 310).

**As per claim 12:**

Most of the limitations of the claim have been noted in the rejection of claim 10. In addition, Wolf et al. teach that quantities are used to compute a signal-to-noise ratio estimate from the extrinsic. The extrinsic are distributed as a Gaussian probability distribution function, with one mean and another mean. Each mode has the same conditional variance and the absolute value of the probability distribution function is taken, making a single mean at  $+m$ . An increase in this mean indicates greater certainty in the value of the decoded bits. An increase in the variance would indicate less certainty in the decoded values. Further Wolf teaches that if the absolute value is not taken of the probability distribution function, the two means (the positive and negative modes) will diverge as decoding progresses and an estimate of signal quality based on the mean and variance of the extrinsic is computed and the bottom half of the block diagram in FIG. 4 generates the signal quality estimate, which is then compared with the threshold  $K$ . If the quality estimate is greater than the threshold, then the Exceed signal is active (see col. 7, lines 4-38).

**As per claim 17:**



Wolf et al. teach all the subject matter claimed in claim 10 but Wolf et al. do not explicitly detail that the decoder (turbo decoder) comprising a WCDMA UE.

Nevertheless, as would have been well known (WCDMA UE are known in the art of turbo decoding systems since turbo codes are commonly (typically) used for error correction on the CDMA forward and backward links) to one ordinary skill in the art at the time the invention was made, such WCDMA user equipment (a mobile station) are used to communicate with any one or more of a plurality of base station subsystems in a geographic region. Accordingly, it would have been obvious to one ordinary skill in the art to include user equipment because such equipment would have been required to communicate with a base station in the wireless communication systems.

### **Claim objections**

6. Claims **4-7, 9, 13-16 and 18** are objected to as being dependent upon a rejected base claim but would be allowable if rewritten independent from including all of the limitation of the base claim and any intervening claims.

#### **As per claims 4 and 13:**

The claimed invention comprises a detector that considers at least one inequality where 1)  $SE_AEB(L)$  less than or equal to  $const1 \times SEAEB(1)$ ; 2)  $SEAEB(L)$  less than or equal to  $const2 \times S$ ; 3)  $SEA(L)$  less than or equal to  $const3 \times S$ ; 4)  $SEB(L)$  less than or equal to  $const3 \times S$ ; 5)  $EA(L)$  less than or equal to  $const4 \times EA(1)$ ; 6)  $EB(L)$  less than or equal to  $const4 \times EB(1)$ ; 7)  $EAEB(L)$  less than or equal to  $const4 \times EAEB(1)$ ; 8)  $EA(L)$  less than or equal to  $const5 \times S$ ; and 9)  $EB(L)$  less than or equal to  $const5 \times S$ ; where

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L represents the number of a last turbo decoder round, where  $<$  represents "less than or equal to", where  $\times$  represents times (multiplication), and where const represents a constant value, where if any one of inequalities are found to be true, then it is determined that the received signal does not comprise a valid turbo coded code word, and where  $SEAEs(n)$  denotes a sum of absolute values of soft values after an  $n^{th}$  turbo round,  $EAEB(n)$  denotes a sum of absolute values of sums of extrinsic values of A-parities and extrinsic values of B-parities after an  $n^{th}$  turbo round,  $EA(n)$  denotes a sum of absolute values of extrinsic values of A-parities after the  $n^{th}$  turbo round;  $EB(n)$  denotes a sum of absolute values of extrinsic values of B-parities after the  $n^{th}$  turbo round;  $SEA(n)$  denotes a sum of absolute values of sums of systematic samples and extrinsic values of A-parities after the  $n$  turbo round,  $SEn(n)$  denotes a sum of absolute values of sums of systematic samples and extrinsic values of B-parities after the  $n^{th}$  turbo round, and S denotes a sum of absolute values of systematic samples which the prior art do not teach or render obvious.

Claims **5-7, 9, 14-16 and 18**, which are directly or indirectly dependents of claims 4 and 13 are also objected.

### Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US PN: 6,904,555 Nagase et al.

US PN: 6,950,977 Lavi et al.

US PN: 6,988,233 Kanai et al.

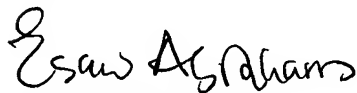
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US PN: 6,888,901 Yu et al.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Esaw Abraham whose telephone number is (571) 272-3812. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are successful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for after final communications.

Information regarding the status of an Application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or PUBLIC PAIR. Status information for unpublished applications is available through Private Pair only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Esaw Abraham

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GUY LAMARRE  
PRIMARY EXAMINER